

## Amendment to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims

1. (Currently amended) A method for identifying agents that modulate PP2A methylation, the method comprising steps of:
  - providing a plurality of candidate test agents;
  - assessing effects of individual candidate test agents on PP2A methylation status in a PP2A methylation assay that contains PP2A, a PP2A methylase enzyme, and a PP2A demethylase enzyme; and
  - identifying, based on the assessed effects, one or more test agents that modulate PP2A methylation.
- 2-3. (Canceled)
4. (Currently amended) The method of claim 1, wherein the step of assessing comprises assessing phosphorylation of a PP2A substrate included in the assay, which substrate phosphorylated protein is tau.
5. (Currently amended) The method of claim 4, wherein tau is hyperphosphorylated in the assay without test agent, and wherein the one or more test agents increase agent increases methylation of PP2A and decreases tau hyperphosphorylation.
6. (Previously presented) A method for identifying a composition that modulates PP2A methylation status, the method comprising steps of:
  - providing a composition;
  - assessing effects of the composition on PP2A methylation status in a PP2A methylation assay that contains PP2A, a PP2A methylase enzyme, and a PP2A demethylase enzyme; and
  - determining, based on the assessed effects, that the composition modulates PP2A methylation status.

7. (Previously presented) The method of claim 6, wherein the composition is an extract of a natural product.
8. (Previously presented) The method of claim 6, wherein the composition is an extract of a traditional medicine.
9. (Canceled)
10. (Currently amended) The method of ~~claim 6~~claim 17, wherein the step of assessing comprises assessing phosphorylation of a PP2A substrate included in the assay, which substrate phosphorylated protein is tau.
11. (Currently amended) The method of ~~claim 10~~claim 17, wherein tau is hyperphosphorylated in the assay without the composition, and wherein the composition increases methylation of PP2A and decreases tau hyperphosphorylation.
12. (Withdrawn) A compound identified by the method of claim 1.
13. (Withdrawn) A composition identified by the method of claim 6.
14. (Withdrawn) A composition comprising a compound according to claim 12.
15. (Withdrawn) A method for treatment of cells to alter therein an activity of a protein, comprising administering to the cells by an effective route a compound of claim 12 in an amount effective to alter therein the activity of the protein.
16. (Withdrawn) A method for treatment of cells to alter therein an activity of a protein, comprising administering to the cells by an effective route a composition of claim 13 in an amount effective to alter therein the activity of the protein.
17. (Currently amended) The method of claim 1 ~~or claim 3~~, wherein the PP2A methylation assay determines activity of a PP2A methylase enzyme or PP2A demethylase enzyme.
- 18-19. (Canceled)

20. (Previously presented) The method of claim 6, wherein the assessed effects comprise activity of the PP2A methylase enzyme.
21. (Previously presented) The method of claim 6, wherein the assessed effects comprise activity of the PP2A demethylase enzyme.
22. (Previously presented) The method of claim 17, wherein the activity is binding to PP2A.
23. (Previously presented) The method of claim 20, wherein the activity is binding to PP2A.
24. (Previously presented) The method of claim 21, wherein the activity is binding to PP2A.
25. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents affect agent or the composition affects phosphatase activity of PP2A through their its effects on PP2A methylation.
26. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents increase agent or the composition increases PP2A methylation.
27. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents activate agent or the composition activates the PP2A methylase enzyme.
28. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents activate agent or the composition activates the PP2A methylase enzyme, the PP2A demethylase enzyme, or both the PP2A methylase enzyme[[,]]and the PP2A demethylase enzyme.
29. (Currently amended) The method of claim 28, wherein the one or more test agents do agent or the composition does not activate the PP2A demethylase enzyme.
30. (Currently amended) The method of claim 28, wherein the PP2A methylation status results from the overall effect effects of the one or more test agents agent or the composition on the PP2A methylase enzyme and the PP2A demethylase enzyme.
31. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents inhibit agent or the composition inhibits the PP2A demethylase enzyme.

32. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents inhibit agent or the composition inhibits the PP2A methylase enzyme, the PP2A demethylase enzyme, or both the PP2A methylase enzyme[[,]]and the PP2A demethylase enzyme.

33. (Currently amended) The method of claim 32, wherein the one or more test agents do agent or the composition does not inhibit the PP2A methylase enzyme.

34. (Currently amended) The method of claim 32, wherein the PP2A methylation status results from the overall effect effects of the one or more test agents agent or the composition on the PP2A methylase enzyme and the PP2A demethylase enzyme.

35. (Canceled) ~~The method of claim 1 or 6, wherein at least one test agent or the composition is not already known to modulate PP2A methylation.~~

36. (Currently amended) The method of claim 1-~~or 6~~, wherein the one or more test agents interfere at least one test agent or the composition interferes with PP2A subunit assembly.

37. (Currently amended) The method of claim 36, wherein the one or more test agents interfere agent interferes with binding of the methylase, the demethylase enzyme, or both the methylase and the demethylase enzyme to PP2A.

38. (Currently amended) The method of claim 1-~~or 6~~, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is purified.

39. (Currently amended) The method of claim 1-~~or 6~~, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a partially purified extract.

40. (Currently amended) The method of claim 1-~~or 6~~, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is expressed in a cell.

41. (Currently amended) The method of claim 1-~~or 6~~, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a mouse that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.

42. (Currently amended) The method of claim 1-~~or 6~~, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a human that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.

43. (Currently amended) The method of claim 1-~~or 6~~, wherein the step of assessing comprises contacting the test agents ~~agent or composition~~ with cells that express one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.

44. (Currently amended) The method of claim 43, wherein the step of contacting ~~or administering~~ is followed by a step of determining the PP2A methylation status with the test agents relative to the PP2A methylation status without the test agents of PP2A.

45. (Currently amended) The method of claim 44, wherein the PP2A methylation status refers to an increase in PP2A methylation with the test agents relative to the PP2A methylation status without the test agents.

46. (Currently amended) The method of claim 44, wherein the PP2A methylation status refers to a decrease in PP2A methylation with the test agents relative to the PP2A methylation status without the test agents.

47. (Currently amended) The method of claim 43, wherein the step of contacting ~~or administering~~ is followed by a step of determining the phosphorylation status of at least one substrate of PP2A.

48. (Previously presented) The method of claim 47, wherein the at least one substrate of PP2A is tau or MAP kinase.

49. (Currently amended) The method of claim 47, wherein the step of determining phosphorylation status refers to detecting an increase in PP2A phosphorylation.

50. (Currently amended) The method of claim 47, wherein the step of determining phosphorylation status refers to detecting a decrease in PP2A phosphorylation.

51. (Currently amended) The method of claim 1-~~or 6~~, wherein the step of assessing comprises administering the test agents agent or composition to an organism that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.

52. (Currently amended) The method of claim 51, wherein the step of contacting or administering is followed by a step of determining the PP2A methylation status with the test agents or the composition relative to the PP2A methylation status without the test agents or the composition of PP2A.

53. (Currently amended) The method of claim 52, wherein the step of determining PP2A methylation status refers to detecting an increase in PP2A methylation with the test agents relative to the PP2A methylation status without the test agents.

54. (Currently amended) The method of claim 52, wherein the PP2A methylation status refers to a decrease in PP2A methylation with the test agents relative to the PP2A methylation status without the test agents.

55. (Currently amended) The method of claim 51, wherein the step of contacting or administering is followed by a step of determining the phosphorylation status of at least one substrate of PP2A.

56. (Previously presented) The method of claim 55, wherein the at least one substrate of PP2A is tau or MAP kinase.

57. (Currently amended) The method of claim 55, wherein the step of determining phosphorylation status refers to detecting an increase in PP2A phosphorylation.

58. (Currently amended) The method of claim 55, wherein the step of determining phosphorylation status refers to detecting refers to a decrease in PP2A phosphorylation.

59. (Currently amended) A method for identifying agents that modulate PP2A methylation, the method comprising steps of:  
providing a plurality of test agents that modulate PP2A methylation status in a PP2A methylation assay that contains PP2A, a PP2A methylase enzyme, and a PP2A

demethylase enzyme;

identifying at least one structural moiety whose presence correlates with modulation of PP2A methylation in the PP2A methylation assay;  
providing at least one candidate test agent that also shares the structural moiety;  
assessing effects of the at least one candidate test agent on PP2A methylation status in an assay that contains PP2A, a PP2A methylase enzyme, and a PP2A demethylase enzyme; and  
identifying, based on the assessed effects, one or more test agents that modulate PP2A methylation.

60. (New) The method of claim 6, wherein the composition affects phosphatase activity of PP2A through its effects on PP2A methylation.
61. (New) The method of claim 6, wherein the composition increases PP2A methylation.
62. (New) The method of claim 6, wherein the composition activates the PP2A methylase enzyme.
63. (New) The method of claim 6, wherein the composition activates the PP2A methylase enzyme, the PP2A demethylase enzyme, or both the PP2A methylase enzyme and the PP2A demethylase enzyme.
64. (New) The method of claim 63, wherein the composition does not activate the PP2A demethylase enzyme.
65. (New) The method of claim 63, wherein the PP2A methylation status results from effects of the composition on the PP2A methylase enzyme and the PP2A demethylase enzyme.
66. (New) The method of claim 6, wherein the composition inhibits the PP2A demethylase enzyme.
67. (New) The method of claim 6, wherein the composition inhibits the PP2A methylase enzyme, the PP2A demethylase enzyme, or both the PP2A methylase enzyme and the PP2A demethylase enzyme.

68. (New) The method of claim 67, wherein the composition does not inhibit the PP2A methylase enzyme.
69. (New) The method of claim 67, wherein the PP2A methylation status results from effects of the composition on the PP2A methylase enzyme and the PP2A demethylase enzyme.
70. (New) The method of claim 6, wherein the composition interferes with PP2A subunit assembly.
71. (New) The method of claim 70, wherein the composition interferes with binding of the methylase, the demethylase enzyme, or both the methylase and the demethylase enzyme to PP2A.
72. (New) The method of claim 6, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is purified.
73. (New) The method of claim 6, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a partially purified extract.
74. (New) The method of claim 6, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is expressed in a cell.
75. (New) The method of claim 6, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a mouse that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.
76. (New) The method of claim 6, wherein one or more of the PP2A, the methylase enzyme, and the demethylase enzyme is provided in the form of a human that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.
77. (New) The method of claim 6, wherein the step of assessing comprises contacting the composition with cells that express one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.

78. (New) The method of claim 77, wherein the step of contacting is followed by a step of determining the PP2A methylation status with the composition relative to the PP2A methylation status without the composition.
79. (New) The method of claim 78, wherein the PP2A methylation status refers to an increase in PP2A methylation with the composition relative to the PP2A methylation status without the composition.
80. (New) The method of claim 78, wherein the PP2A methylation status refers to a decrease in PP2A methylation with the composition relative to the PP2A methylation status without the composition.
81. (New) The method of claim 77, wherein the step of contacting is followed by a step of determining phosphorylation status of at least one substrate of PP2A.
82. (New) The method of claim 81, wherein the at least one substrate of PP2A is tau or MAP kinase.
83. (New) The method of claim 81, wherein the step of determining phosphorylation status refers to detecting an increase in PP2A phosphorylation.
84. (New) The method of claim 81, wherein the step of determining phosphorylation status refers to detecting a decrease in PP2A phosphorylation.
85. (New) The method of claim 1 or 6, wherein the step of assessing comprises administering the composition to an organism that produces one or more of the PP2A, the methylase enzyme, and the demethylase enzyme.
86. (New) The method of claim 85, wherein the step of administering is followed by a step of determining the PP2A methylation status with the composition relative to the PP2A methylation status without the composition.
87. (New) The method of claim 86, wherein the step of determining PP2A methylation status refers to detecting an increase in PP2A methylation with the composition relative to the PP2A methylation status without the composition.

88. (New) The method of claim 86, wherein the PP2A methylation status refers to a decrease in PP2A methylation with the composition relative to the PP2A methylation status without the composition.
89. (New) The method of claim 85, wherein the step of administering is followed by a step of determining the phosphorylation status of at least one substrate of PP2A.
90. (New) The method of claim 89, wherein the at least one substrate of PP2A is tau or MAP kinase.
91. (New) The method of claim 89, wherein the step of determining phosphorylation status refers to detecting an increase in PP2A phosphorylation.
92. (New) The method of claim 89, wherein the step of determining phosphorylation status refers to detecting refers to a decrease in PP2A phosphorylation.